Name:

at1124exam: Radicals and Squares (v816)

Question 1

Simplify the radical expressions.

$\sqrt{20}$	$\sqrt{27}$	$\sqrt{12}$
$\sqrt{2 \cdot 2 \cdot 5}$	$\sqrt{3 \cdot 3 \cdot 3}$	$\sqrt{2 \cdot 2 \cdot 3}$
$2\sqrt{5}$	$3\sqrt{3}$	$2\sqrt{3}$

Question 2

Find all solutions to the equation below:

$$2\left((x-5)^2+10\right) \;=\; 92$$

First, divide both sides by 2.

$$(x-5)^2+10=46$$

Then, subtract 10 from both sides.

$$(x-5)^2=36$$

Undo the squaring. Remember the plus-minus symbol.

$$x-5=\pm 6$$

Add 5 to both sides.

$$x=5\pm 6$$

So the two solutions are $x=11$ and $x=-1$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 6x = 91$$

$$x^2 - 6x + 9 = 91 + 9$$
$$x^2 - 6x + 9 = 100$$
$$(x-3)^2 = 100$$
$$x - 3 = \pm 10$$
$$x = 3 \pm 10$$
$$x = 13 \quad \text{or} \quad x = -7$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 2x^2 - 12x + 13$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .

$$y = 2(x^2 - 6x) + 13$$

We want a perfect square. Halve -6 and square the result to get 9 . Add and subtract that value inside the parentheses.

$$y = 2(x^2 - 6x + 9 - 9) + 13$$

Factor the perfect-square trinomial.

$$y = 2((x-3)^2 - 9) + 13$$

Distribute the 2.

$$y = 2(x-3)^2 - 18 + 13$$

Combine the constants to get **vertex form**:

$$y = 2(x-3)^2 - 5$$

The vertex is at point $(3, -5)$.